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Protocol for Evaluating Interim Status Closure/Post-Closure Plans

Kearney (A.T.), Inc., Chicago, IL

Prepared for

Environmental Protection Agency, Washington, DC

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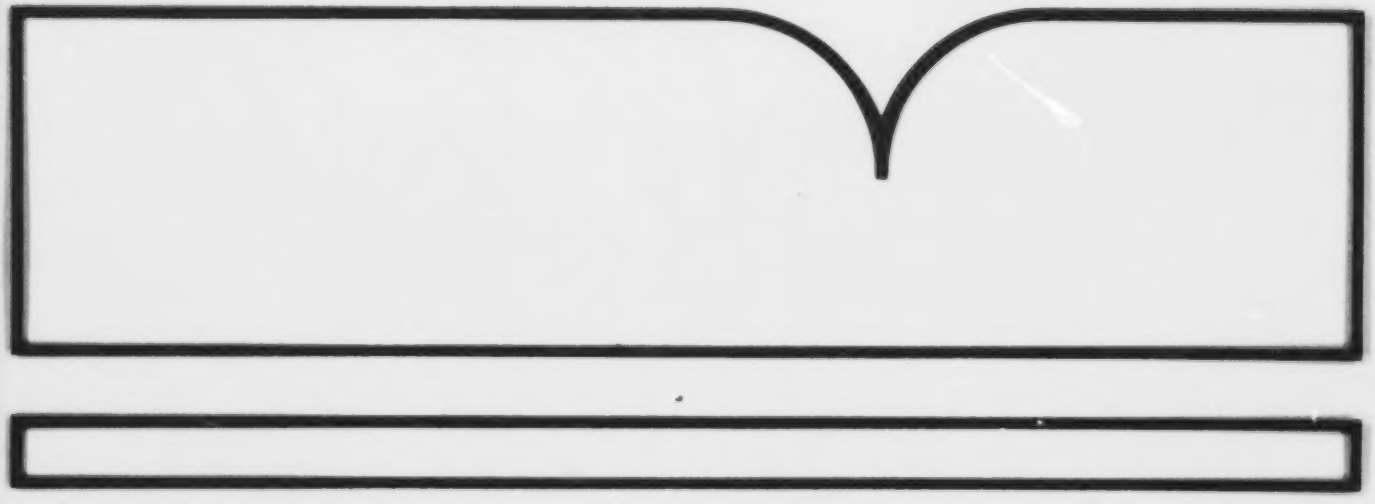

U.S. Department of Commerce
National Technical Information Service
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EPA SOLID WASTE

PROTOCOL FOR EVALUATING INTERIM STATUS CLOSURE / POST-CLOSURE PLANS

U.S. Environmental Protection Agency

August
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EVALUATION OF THIRTEEN SPILL RESPONSE TECHNOLOGIES

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See also RCRA Permit Quality Protocol.
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16. Abstract (Limit: 200 words)

The protocol provides a format for evaluating the quality of interim status closure and post-closure plans approved by States or EPA Regions for implementation by owners/operators. It is intended for use by technical or non-technical personnel and is designed to assist in detecting omissions and inadequate plan provisions. Effective use of the protocol requires a working knowledge of the RCRA regulations and Agency policy and guidance, along with some familiarity of RCRA closure and post-closure plans.

The protocol does not consider the direct evaluation of technical adequacy, but rather identifies the technical items that must be addressed by the closure plan. It also identifies those supporting documents, analyses, etc., that must be in the administrative record. This is intended to help the reviewer ascertain whether the plan was properly derived and whether the process followed was properly documented in the record.

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ERRATA SHEET

RCRA Closure/Post-Closure Plan Quality Protocol

Parts 1 through 3

1. No changes.

Part 4

2. Page 4-46: Add "TEGD" under reference column.

3. Page 4-47: Add "TEGD" under reference column.

EPA SOLID WASTE

PROTOCOL FOR EVALUATING INTERIM STATUS CLOSURE / POST-CLOSURE PLANS

U.S. Environmental Protection Agency

August
1986

PROTOCOL FOR EVALUATING THE QUALITY OF APPROVED INTERIM STATUS CLOSURE AND POST-CLOSURE PLANS

This publication was prepared
for the Office of Solid Waste
under Contract No. 68-01-7038

by

A.T. Kearney, Inc.
and
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U.S. Environmental Protection Agency

August
1986

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GENERAL INSTRUCTIONS
FOR CLOSURE REVIEWS

INTRODUCTION

This protocol has been developed to provide a format for evaluating the quality of interim status closure and post-closure plans approved by states or by EPA Regions. This intended use may not be the only practical application of the document. The checklist and guidance provided herein also may be of value to EPA and state agency staff responsible for reviewing closure and post-closure plans.

This document is a companion document to, and is modeled after, the "RCRA Permit Quality Protocol." This protocol is divided into four major parts.

- Part 1 - Facility Information
- Part 2 - Available Records
- Part 3 - Closure/Post-Closure Plan Checklist
- Part 4 - Guidance For Evaluation of Closure and Post-Closure Plans

The structure of the protocol lends itself to a multi-level review of approved plans. The reviewer can use Parts 1 and 2 to determine whether the administrative record for a facility is complete and whether the appropriate procedural requirements were followed. Utilizing Parts 3 and 4 of the protocol, the reviewer can determine if the approved plan addresses all required elements of closure and post-closure (as applicable) and if the elements of the plan are technically sound and enforceable.

The protocol is designed to focus on the documentation associated with the agency's initial review of the closure/post-closure plan, rather than on the technical judgements made during that initial review. For example, the intent of the audit process is to determine if design calculations provided by the owner/operator were properly checked and approved during the original review, rather than to check the calculations to determine their accuracy.

Effective use of the protocol requires a working knowledge of the RCRA regulations, along with some familiarity with the format and content of closure plans. The reviewer will find it helpful to have a copy of the RCRA regulations at hand when conducting a closure plan review.

Field testing of the protocol has shown that use of the Checklist (Part 3) to determine if the plan contains all required conditions results in a rapid preliminary indication of the quality of a plan. This suggests two approaches to auditing the approved plans. A large number of plans can be examined rather rapidly using only Parts 1

through 3 of the protocol. The reviewer may wish to confirm the conclusions of that process by spot checking the quality of a few conditions using the evaluation criteria of Part 4 of the protocol.

Alternatively, the reviewer may want to focus on fewer plans by applying the entire protocol to each plan examined. Although more time consuming, this approach results in a thorough audit of each plan.

The most effective use of the protocol may be to combine the two approaches discussed above. That is, Parts 1 through 3 of the protocol are applied to all plans to be audited, with certain of those plans selected for more intense scrutiny utilizing the Part 4 guidance.

Given below is a brief description of each part of the protocol, along with comments on their use.

PART 1 - FACILITY INFORMATION

This short form focuses on data and information about the facility and the wastes handled. Completion of this form provides the reviewer with the information needed to determine what portions of the Checklist (Part 3) and the Evaluation Guidance (Part 4) are applicable to the plan undergoing review. It also enables the reviewer, when completing the checklist, to recognize which optional provisions must be in the plan.

PART 2 - AVAILABLE RECORDS

The available records checklist enables the reviewer to evaluate the following:

1) Whether the Administrative Record is complete;

2) if proper steps have been taken in approving the plan and in soliciting public comment; and

3) if adjustments to the plan have been made to reflect substantive public comments.

A key consideration is the file or administrative record. The materials found in the administrative record should document and support closure/post-closure plan elements. The evaluation of elements conducted under Part 4 of this protocol relies heavily upon scrutiny of the various documents found in the administrative record. Inventory of the administrative record enables the reviewer not only to assess its completeness, but also to become familiar with its contents in preparation for evaluating the plans.

PART 3 - CLOSURE/POST-CLOSURE PLAN CHECKLIST

The checklist is a structured listing of all elements of closure and post-closure plans. It is organized in eleven sections, as follows:

I General Closure Requirements
II General Post-Closure Requirements

III	Container Storage Areas
IV	Tanks
V	Surface Impoundments
VI	Waste Piles
VII	Land Treatment Units
VIII	Landfills
IX	Incinerators
X	Thermal Treatment Units
XI	Chemical, Physical and Biological Treatment Units

The checklist is intended to be an administrative checklist for recording the presence or absence of each required element of a closure/post-closure plan. The actual quality (or adequacy) of those conditions is considered in greater detail in Part 4 of the protocol. Checklist items included in the protocol are denoted with a "+" symbol in the left-hand margin.

In completing the checklist the reviewer simply marks each item as provided (denoted by Y), not provided (denoted by N), or as not applicable (denoted by NA) and indicates the location of the item. The comments column may be used by the reviewer for any notations desired. For example, the reviewer may provide a reminder to check a certain element using the Evaluation Guidance (Part 4). Or, the reviewer may provide a notation to discuss the rationale for a certain decision with the permit writer.

PART 4 - EVALUATION GUIDANCE FOR CLOSURE AND POST-CLOSURE PLANS

Part 4 of the protocol provides a format and guidance for evaluating the adequacy of selected elements of closure and post-closure plans. The elements included in this portion of the protocol are those generally believed to be more critical to the proper closure of hazardous waste management units, and/or those having a high potential for problems in translating regulatory requirements to specific design features or activities. These items are denoted on the Part 3 checklist with a "+" in the left-hand margin.

The Part 4 guidance is designed to evaluate closure/post-closure plan elements for basis of the following criteria:

1) Consistency with regulations and applicable guidance; and

2) Adequacy of documentation and other substantiation of technical soundness.

The evaluation guidance for each element consists of a matrix with four columns - regulatory requirement, evaluation criteria, references, and findings/comments.

The regulatory requirement consists of a brief statement defining what the element must address or encompass. This enables the reviewer to evaluate if the closure plan provision is consistent with regulations. The regulatory citations given in Part 4 (and in the Part 3 Checklist) are to the Federal regulations. When reviewing State-approved closure plans, citations to the appropriate State

regulations may be encountered. In some instances, the regulatory language or requirements may vary from the Federal regulations.

The evaluation criteria consider technical soundness. Technical soundness encompasses both technical correctness and proper documentation and supporting evidence for the technical content of a plan. This protocol does not consider the direct evaluation of technical adequacy, but rather identifies the technical items that must be addressed by the closure plan, and those supporting documents, analyses, etc., that must be in the administrative record. This should enable the reviewer to ascertain whether the plan was properly derived and whether the process followed was properly documented in the record.

The findings/comments column provides space for the reviewer to write notes regarding the findings of the evaluation or to provide other relevant notations.

PART 1

FACILITY INFORMATION

PART 1

INTERIM STATUS CLOSURE/POST-CLOSURE PLAN FACILITY INFORMATION

1. Facility Name: _____

2. Location: _____

3. EPA I.D. Number: _____

4. Owner/Operator: _____

5. Address of Owner/Operator: _____

6. Treatment, Storage or Disposal Units Closed:

	Previously Closed	To be Closed
Container Storage	___	___
Tanks	___	___
Waste Piles	___	___
Surface Impoundments	___	___
Landfills	___	___
Land Treatment Units	___	___
Incinerator	___	___
Thermal Treatment Units	___	___
Other	___	___

7. Final Closure ___ Partial Closure ___

8. Major wastes or types of wastes handled at the facility:

_____

_____

_____

_____

9. If the facility includes land disposal units, do the data obtained during the interim status monitoring program show any evidence of groundwater contamination?

___ Yes ___ No ___ No data or inadequate data

10. During the period of operation were any enforcement actions taken against the owner/operator? If yes, summarize (type and date of actions, status of actions, current compliance status, etc.).

___ Yes ___ No ___ Enforcement file not reviewed

Note: Items 9 and 10 provide useful guidance on the need for special closure measures or post-closure provisions.

PART 2

AVAILABLE RECORDS

PART 2

INTERIM STATUS CLOSURE/POST-CLOSURE PLAN
AVAILABLE RECORDS

The contents of the administrative record or other agency files associated with the facility must be inventoried. Indicate below the items contained in the file.

___ Part A application; Date: _____

___ Biennial waste quantity reports

___ Closure and post-closure (where appropriate) plans, along with any supporting data, technical reports, etc., provided by the applicant

___ Any agency review comments sent to the applicant, along with the applicant's amended or supplemental information

___ Documentation resulting from the agency's technical evaluation of the closure/post-closure plan

___ Interim status groundwater monitoring data (for land disposal facilities)

___ Part B application (where appropriate)

___ Owner/operator's and independent professional registered engineer's certification of closure (when facilities already have been closed in accordance with the approved closure plan)

___ Public notice of availability of plan for public comment

___ All comments received during the public comment period

___ Tape or transcript of any hearings held and any written materials submitted at hearings

___ Responses to significant comments posed during the comment period and/or hearing

___ Modified closure/post-closure plan (in cases where substantive comments were made) along with an explanation of the changes

___ Record of wastes

___ Survey plat

___ Notice in deed to property

___ Biennial reports

___ Unmanifested waste reports

___ Cost estimates and financial responsibility documents

___ Requests to amend approved plan; Agency's response

___ Requests for extension of closure deadlines; Agency's response

___ Reports of releases, fires, etc. (as required by 40 CFR 265.77)

___ Other (specify)

PART 3

CLOSURE/POST-CLOSURE PLAN CHECKLIST

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
I.	GENERAL CLOSURE REQUIREMENTS			
+A.	Partial and/or Final Closure			
A-1.	Closure performance standards [§265.111]			
A-2.	Contents of plan [§265.112(b)]			
+A-2a.	Maximum inventory of wastes [§265.112(b)(3)]			
A-2b.	Removal/decontamination procedures [§265.112(b)(4)]			
A-2c.	Other activities during closure period [§265.112(b)(5)]			
+A-2d.	Closure schedule for each unit/final closure [§265.112(b)(6) and (7)]			
+A-3.	Amendment of closure plan [§265.112(c)]			
A-4.	Notification of partial and final closure [§265.112(d)]			
A-5.	Closure activities performed prior to closure plan approval [§265.112(e)]			
+B.	Time Allowed for Closure [§265.113]			
B-1.	Extension of closure timeframes [§265.113(a) and (b)]			
B-2.	Timeframes for demonstrations for extensions [§275.113(c)]			
C.	Disposal or Decontamination of Equipment, Structures and Soils [§265.114]			
+D.	Certification of Closure			
+E.	Survey Plat and Certification by Professional Land Surveyor [§265.116]			
F.	Notices [§265.119]			
F-1.	Record of wastes [§265.119(a)]			
F-2.	Notice in deed [§265.119(b)]			

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
F-3.	Certification of notice [§265.119(b)(2)]	____	_____	_____
+G.	Closure Cost Estimate [§265.142]	____	_____	_____
G-1.	Adjustments to closure cost estimates [§265.142(b)]	____	_____	_____
G-2.	Revisions to closure cost estimates [§265.142(c)]	____	_____	_____
H.	Financial Assurance for Closure [§265.143]	____	_____	_____
I.	Liability Coverage [§265.147]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
II.	GENERAL POST-CLOSURE REQUIREMENTS			
A.	Post-closure Care and Use of Property [§265.117]			
+A-1.	Length of post-closure period specified [§265.117(a)(1)]	____	_____	_____
+A-2.	Increasing/decreasing length of post-closure period [§§265.117(a)(2), 265.118(g)]	____	_____	_____
A-3.	Security requirements [§265.117(b)]	____	_____	_____
A-4.	Property use restrictions [§265.117(c)]	____	_____	_____
B.	Submittal of Post-closure Plan [§265.118(a)]	____	_____	_____
C.	Availability of Post-closure Plan	____	_____	_____
D.	Content of Post-closure Plan [§§265.117(a)(1), 265.118(c)]			
D-1.	Monitoring activities described [§265.118(c)(1)]	____	_____	_____
D-2.	Maintenance activities described [§265.118(c)(2)]	____	_____	_____
D-3.	Post-closure contact identified [§265.118(c)(3)]	____	_____	_____
+E.	Amendment of Post-closure Plan [§265.118(d) and (g)]	____	_____	_____
+F.	Post-closure Notices [§265.119]			
F-1.	Notice to local zoning authority/record of wastes [§265.119(a)]	____	_____	_____
F-2.	Notice in deed [§265.119(b)(1)]	____	_____	_____
F-3.	Certification of notice [§265.119(b)(2)]	____	_____	_____
F-4.	Removal of wastes from a closed landfill [§265.119(c)]	____	_____	_____
+G.	Certifications of Completion of Post-closure Care [§265.120]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
+H.	Post-closure Care Cost Estimate [§265.144]	____	_____	_____
H-1.	Adjustments to post-closure care cost estimates [§265.144(b)]	____	_____	_____
+H-2.	Revisions to post-closure care cost estimates [§265.144(c)]	____	_____	_____
I.	Financial Assurance for Post-closure Care [§265.145]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
III.	CLOSURE OF CONTAINER STORAGE AREAS			
A.	Contents of Plan [§264.112(b)]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§265.112(b)(3)]	____	_____	_____
A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
B.	Decontamination Procedures [§§265.112(b)(4), 265.114]			
+B-1.	Procedures for cleaning equipment and removing contaminated soils [§265.112(b)(4)]	____	_____	_____
+B-2.	Management of generated wastes [§265.114]	____	_____	_____
+B-3.	Methods for sampling and testing to demonstrate success of decontamination [§265.112(b)(4)]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
IV.	CLOSURE OF TANKS			
A.	Contents of Plan [§264.112(b)]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§§265.112(b)(3), 265.197]	____	_____	_____
+A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114, 265.197]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
+B.	Decontamination Procedures [§§265.112(b)(4), 265.114, 265.197]			
B-1.	Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.197]	____	_____	_____
B-2.	Management of generated wastes [§§265.114, 265.197]	____	_____	_____
+B-3.	Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.197]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

	Provided (Y/N) or NA	Location	Comments
V. CLOSURE OF SURFACE IMPOUNDMENTS			
A. Closure by Waste Removal [§265.228]			
A-1. Contents of closure plan [§264.112(b)]	____	_____	_____
A-1a. Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-1b. Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-1c. Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-1d. Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
+A-1e. Detailed description of removal of waste inventory [§§265.112(b)(3), 265.228(a)]	____	_____	_____
+A-1f. Detailed description of removal of waste residues [§§265.112(b)(4), 265.228(a)]	____	_____	_____
A-1g. Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-1h. Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-1i Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
A-2. Decontamination procedures [§§265.112(b)(4), 265.228]			
A-2a. Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.228(a)]	____	_____	_____
A-2b. Management of generated wastes [§§265.114, 265.228(b)]	____	_____	_____
+A-2c. Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.228(b)]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
A-2d.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____
+B.	Closure as a Landfill* [§§265.228(c), 265.310]	____	_____	_____
C.	Post-closure Care* [§§265.118(a), 265.310]	____	_____	_____

*Note: See Section VIII (Closure of Landfills) for the facilities that must meet the requirements of items B and C.

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

	Provided (Y/N) or NA	Location	Comments
VI. CLOSURE OF WASTE PILES			
A. Closure by Waste Removal [§265.228]			
A-1. Contents of closure plan [§264.112(b)]	____	_____	_____
A-1a. Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-1b. Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-1c. Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-1d. Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-1e. Detailed description of removal of waste inventory [§§265.112(b)(3), 265.258(a)]	____	_____	_____
+A-1f. Detailed description of removal of waste residues [§§265.112(b)(4), 265.258(a)]	____	_____	_____
A-1g. Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-1h. Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-1i Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
A-2. Decontamination procedures [§§265.112(b)(4), 265.228]			
+A-2a. Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.258(a)]	____	_____	_____
A-2b. Management of generated wastes [§§265.114, 265.258(b)]	____	_____	_____
+A-2c. Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.258(b)]	____	_____	_____

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
A-2d.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____
+B.	Closure as a Landfill* [§§265.258(b), 265.310]	____	_____	_____
C.	Post-closure Care* [§§265.118(a), 265.310]	____	_____	_____

*Note: See Section VIII (Closure of Landfills) for the facilities that must meet the requirements of items B and C.

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
VII.	CLOSURE OF LAND TREATMENT UNITS			
A.	Contents of Plan [§264.112(b)]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§265.112(b)(3)]	____	_____	_____
A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
B.	Decontamination Procedures [§§265.112(b)(4), 265.114]			
B-1.	Procedures for cleaning equipment and removing contaminated soils [§265.112(b)(4)]	____	_____	_____
B-2.	Management of generated wastes [§265.114]	____	_____	_____
B-3.	Methods for sampling and testing to demonstrate success of decontamination [§265.112(b)(4)]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
C.	Objectives of the closure plan [§265.280(a)]			
+C-1.	Control of migration of hazardous constituents to groundwater [§265.280(a)(1)]	____	_____	_____
+C-2.	Control of release of contaminated runoff to surface water [§265.280(a)(2)]	____	_____	_____
+C-3.	Control of release of airborne particulates [§265.280(a)(3)]	____	_____	_____
+C-4.	Compliance with food-chain crop restrictions [§265.280(a)(4)]	____	_____	_____
D.	Factors to be considered in addressing the closure and post-closure care objectives [§265.280(b)]			
D-1.	Type and amount of hazardous waste/ constituents applied to unit [§265.280(b)(1)]	____	_____	_____
D-2.	Mobility and expected rate of migration of hazardous constituents [§265.280(b)(2)]	____	_____	_____
D-3.	Site location, topography and surrounding land use [§265.280(b)(3)]	____	_____	_____
D-4.	Climate [§265.280(b)(4)]	____	_____	_____
D-5.	Site geology and hydrogeology [§265.280(b)(5)]	____	_____	_____
D-6.	Unsaturated zone monitoring information [§265.280(b)(6)]	____	_____	_____
D-7.	Comparison of hazardous constituents levels on-site vs. background by type, concentration, and depth of migration [§265.280(b)(7)]	____	_____	_____
E.	Methods to be Considered in Addressing the Closure and Post-closure Care Objectives [§265.280(c)]			
+E-1.	Removal of contaminated soils [§265.280(c)(1)]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
+E-2.	Placement of final cover considering certain factors [§265.280(c)(2)]	____	_____	_____
E-2a.	Functions of the cover [§265.280(c)(2)(i)]	____	_____	_____
E-2b.	Characteristics of the cover [§265.280(c)(2)(ii)]	____	_____	_____
E-3.	Groundwater monitoring [§265.280(c)(3)]	____	_____	_____
F.	Additional Requirements for Land Treatment Units During the Closure Period [§265.280(d)]			
+F-1.	Continue unsaturated zone monitoring [§265.280(d)(1)]	____	_____	_____
F-2.	Maintenance of run-on control system [§265.280(d)(2)]	____	_____	_____
+F-3.	Maintenance of runoff management systems [§265.280(d)(3)]	____	_____	_____
F-4.	Control of particulate releases [§265.280(d)(4)]	____	_____	_____
G.	Certifications of Closure [§265.280(e)]	____	_____	_____
H.	Requirements for Land Treatment Units During the Post-closure Care Period [§265.280(f)]			
+H-1.	Continuation of soil-core monitoring [§265.280(f)(1)]	____	_____	_____
+H-2.	Maintenance of access restrictions [§265.280(f)(2)]	____	_____	_____
+H-3.	Compliance with food-chain crop restrictions [§265.280(f)(3)]	____	_____	_____
H-4.	Control of particulate releases [§265.280(f)(4)]	____	_____	_____
+H-5.	Inspection and maintenance procedures [§265.118(c)]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
VIII.	CLOSURE OF LANDFILLS			
A.	Contents of Plan [§§§265.112(b), 265.310]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§265.112(b)(3)]	____	_____	_____
A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
B.	Decontamination Procedures [§§265.112(b)(4), 265.114, 265.310]			
B-1.	Procedures for cleaning equipment and removing contaminated soils [§265.112(b)(4)]	____	_____	_____
B-2.	Management of generated wastes [§265.114]	____	_____	_____
B-3.	Methods for sampling and testing to demonstrate success of decontamination [§265.112(b)(4)]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
+C.	Final Cover Design and Construction [§265.310(a)]			
C-1.	Minimization of liquid migration [§265.310(a)(1)]	____	_____	_____
C-2.	Function with minimum maintenance [§265.310(a)(2)]	____	_____	_____
C-3.	Promotion of drainage and minimization of erosion or abrasion [§265.310(a)(3)]	____	_____	_____
C-4.	Accommodate settling and subsidence [§265.310(a)(4)]	____	_____	_____
C-5.	Permeability standard [§265.310(a)(5)]	____	_____	_____
+D.	Post-closure Care Requirements [§265.310(b)]			
D-1.	Inspection and maintenance of the final cover [§265.310(b)(1)]	____	_____	_____
D-2.	Inspection and maintenance of the groundwater monitoring system [§265.310(b)(2)]	____	_____	_____
D-3.	Run-on and runoff control structures [§265.310(b)(3)]	____	_____	_____
D-4.	Maintenance of surveyed benchmarks [§265.310(b)(4)]	____	_____	_____
D-5.	Gas ventilation system, if applicable [§265.310(b)(1]	____	_____	_____
E.	Groundwater Monitoring Program			
+E-1.	Monitoring system [§265.91]	____	_____	_____
E-1a.	Monitoring well locations [§265.91(a) and (b)]	____	_____	_____
E-1b.	Monitoring well construction [§265.91(c)	____	_____	_____
E-2.	Sampling and analysis [§265.92]	____	_____	_____
+E-2a.	Sampling plan [§265.92(a)]	____	_____	_____
E-2b.	Analytical parameters [§265.92(b)]	____	_____	_____

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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
E-2c.	Establishment of background values [§265.92(c)]	____	_____	_____
E-2d.	Annual and semiannual determinations [§265.92(d)]	____	_____	_____
E-2e.	Groundwater levels [§265.92(e)]	____	_____	_____
E-3.	Preparation, evaluation, and response [§265.93]	____	_____	_____
E-3a.	Groundwater quality assessment program [§265.93(a)]	____	_____	_____
+E-3b.	Statistical comparisons [§265.93(b)]	____	_____	_____
E-3c.	Reporting and confirmation sampling [§265.93(c)]	____	_____	_____
E-3d.	Detailed assessment program [§265.93(d)]			
	o assessment plan [§265.93(d)(2) and (3)]	____	_____	_____
	o implementation [§265.93(d)(4) and (5)]	____	_____	_____
	o reinstate indicator evaluation program [§265.93(d)(6)]	____	_____	_____
	o cessation of assessment program [§265.93(d)(7)]	____	_____	_____
E-3e.	Modification of monitoring system [§265.93(e)]	____	_____	_____
E-4.	Required records and reporting [§265.94]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
IX.	CLOSURE OF INCINERATORS			
A.	Contents of Plan [§264.112(b)]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§§265.112(b)(3), 265.351]	____	_____	_____
+A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114, 265.351]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
B.	Decontamination Procedures [§§265.112(b)(4), 265.114]			
+B-1.	Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.351]	____	_____	_____
B-2.	Management of generated wastes [§§265.114, 265.351]	____	_____	_____
+B-3.	Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.351]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
X.	CLOSURE OF THERMAL TREATMENT UNITS			
A.	Contents of Plan [§264.112(b)]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§§265.112(b)(3), 265.381]	____	_____	_____
+A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114, 265.381]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
B.	Decontamination Procedures [§§265.112(b)(4), 265.114, 265.381]			
+B-1.	Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.381]	____	_____	_____
B-2.	Management of generated wastes [§§265.114, 265.381]	____	_____	_____
+B-3.	Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.381]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

Facility Name _____
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INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or HA	Location	Comments
XI.	**CLOSURE OF CHEMICAL, PHYSICAL, AND BIOLOGICAL TREATMENT UNITS**			
A.	Contents of Plan [§264.112(b)]			
A-1.	Description of how each unit will be closed [§265.112(b)(1)]	____	_____	_____
A-2.	Description of how final closure will be conducted [§265.112(b)(2)]	____	_____	_____
A-3.	Identification of the maximum extent of operation [§265.112(b)(2)]	____	_____	_____
A-4.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	____	_____	_____
A-5.	Detailed description of removal of waste inventory [§§265.112(b)(3), 265.404]	____	_____	_____
A-6.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.114, 265.404]	____	_____	_____
A-7.	Detailed description of other necessary activities [§265.112(b)(5)]	____	_____	_____
A-8.	Schedule for closure of each unit [§265.112(b)(6)]	____	_____	_____
A-9.	Estimate of expected year of final closure [§265.112(b)(7)]	____	_____	_____
B.	Decontamination Procedures [§§265.112(b)(4), 265.114, 265.404]			
B-1.	Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.404]	____	_____	_____
B-2.	Management of generated wastes [§§265.114, 265.404]	____	_____	_____
B-3.	Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.404]	____	_____	_____
B-4.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	____	_____	_____

PART 4

EVALUATION GUIDANCE

FOR

CLOSURE AND POST-CLOSURE PLANS

I. GENERAL CLOSURE REQUIREMENTS
A. Partial and/or Final Closure

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Identification of the steps necessary to perform partial closure (i.e., closure of a single hazardous waste management unit) and/or final closure of the facility (i.e., closure of the entire facility) (§265.112(b)(1) and (2))	For final closure, the plan must identify the steps required to close the facility at its maximum extent of operation. For partial closure, the plan must identify the steps necessary to close a single hazardous waste management unit. The steps required to close must be broken down in sufficient detail such that: 1) The closure process is understandable; 2) A closure schedule can be developed; and 3) Quantities and unit prices can be developed for closure cost estimation. The specific steps required to close a unit or facility should be evaluated in Sections III through XI of this checklist.		

Effective
January 12, 1981

I. GENERAL CLOSURE REQUIREMENTS
A-2. Contents of Plan
A-2a. Maximum Inventory of Wastes

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
An estimate of the maximum inventory of hazardous wastes ever on-site over the active life of the facility and a detailed description of the methods to be used during partial and final closure, including, but not limited to, methods for removing, transporting, treating, storing, or disposing of all hazardous waste, identification of and the type(s) of off-site hazardous waste management unit(s) to be used, if applicable (§265.112(b)(3)).	The maximum inventory generally can be assumed to be the capacity of the unit. Attempts to identify maximum inventory as less than full capacity must be examined carefully for validity. Calculations showing the derivation of maximum inventory must be provided by the applicant and should address all forms of inventory (i.e., wastes in storage, wastes in drainage pipes, etc.). The description of how the hazardous waste will be managed at closure should be evaluated in Sections III through XI of this checklist.		

Effective
January 12, 1981

I. GENERAL CLOSURE REQUIREMENTS
A-2. Contents of Plan
A-2d. Closure Schedule

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A schedule for closure of each hazardous waste management unit and for final closure of the facility (§265.112(b)(6)).	Closure schedule must indicate the total time required for closure, and be broken down sufficiently to allow tracking of the progress of closure. In general, the breakdown should correspond to the steps required to close as described in the closure plan.		
Estimate of expected year of final closure (§265.112(b)(7)).	The closure plan must include an estimate of the expected year of final closure for: (1) facilities that use trust funds to demonstrate financial assurance under §§265.143 or 265.145 and whose remaining operating life is less than twenty years, and (2) facilities without approved closure plans.		

Effective
January 12, 1981

I. GENERAL CLOSURE REQUIREMENTS
A-3. Amendment of Closure Plan

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Amendment of the closure plan (§265.112(c)).	The owner/operator must amend the closure plan whenever: 1) changes in operating plans or facility design affect the closure plan; 2) there is a change in the expected year of closure, if applicable; or, 3) in conducting partial or final closure activities, unexpected events require a modification of the closure plan. The owner/operator must amend the closure plan at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event. If an unexpected event occurs during the partial or final closure period, the owner or operator must amend the closure plan no later than 30 days after the unexpected event. These provisions also apply to owners/operators of surface impoundments and waste piles who intended to remove wastes at closure, but are required to close as landfills per §265.310.		

Effective
January 12, 1981

I. GENERAL CLOSURE REQUIREMENTS
B. Time Allowed for Closure

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Time allowed for closure activities (§265.113).	Unless an exemption is granted, the waste inventory must be treated, removed from the site, or disposed on-site within 90 days after receiving final volume of waste, or within 90 days after approval of the closure plan, whichever is later. Closure must be completed within 180 days after receipt of the final volume of waste, or within 180 days after approval of the closure plan, whichever is later. Any request for extension of closure time must be substantiated by the demonstrations required by §§265.113(a)(1) (for the 90 day period) and 265.113(b)(1) (for the 180 day period).		

Effective
January 12, 1981

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Certification that the hazardous waste management unit or facility has been closed in accordance with the specifications in the approved closure plan (§265.115).	The plan must specify that within 60 days of completion of closure of each surface impoundment, waste pile, land treatment, or landfill unit, and within 60 days of completion of final closure (of the entire facility), the owner/operator will submit certification that the unit or facility, as applicable, has been closed in accordance with the approved closure plan. The certification must be sent by registered mail and must be signed by the owner/operator and an independent registered professional engineer. In the case of land treatment units, a certification may be signed by an independent qualified soil scientist in lieu of the engineer. The plan must specify that documentation supporting the engineer's certification will be furnished upon request until the owner/operator has been released from the financial assurance requirements under §265.143(h).		

I. GENERAL CLOSURE REQUIREMENTS
E. Survey Plat

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Submission of survey plat (§265.116).	The closure plan must state that the survey plat will be submitted, no later than the submission of the closure certification of each hazardous waste disposal unit, to the local zoning authority or the authority with jurisdiction over local land use, and to the Regional Administrator. The survey plat must indicate the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. The plat must be prepared and certified by a professional land surveyor. The plat filed with the local zoning authority or authority with jurisdiction over local land use must contain a note, prominently displayed, stating the obligation to restrict disturbance of the hazardous waste disposal unit.		

Effective
October 29, 1986

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
As per §265.142(a), the closure plan must contain a detailed estimate, in current dollars, of the cost of closing the facility in accordance with the requirements of §§265.111-265.115 and applicable closure requirements of §§265.178, 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.381, and 265.404.	The estimated closure cost must correspond to the point in the facility's operating life when closure would be most costly. This generally corresponds to the maximum extent of the operation and maximum waste inventory. The closure cost estimate must be based on the costs to the owner/operator of hiring a third party to close the facility. A third party is a party who is neither a parent nor a subsidiary of the owner or operator. The cost estimate should be based upon quantities and unit costs for materials and labor (including supervision) as provided by a third party. Closure costs are best understood when they are broken down to parallel the steps required to close given in the description of closure. The owner/operator may use costs for on-site disposal if he can demonstrate that on-site disposal capacity will exist at all times over the life of the facility. The closure cost estimate may not incorporate any salvage value realized from the sale of hazardous wastes, facility structures or equipment, land, or other facility assets at the time of closure. The cost estimate may not assume a zero cost for handling of hazardous wastes with potential economic value.		

Effective
April 7, 1982

II. GENERAL POST-CLOSURE REQUIREMENTS
A. Post-Closure Care and Use of Property
A-1. Length of Post-closure Period
A-2. Adjustments of Post-closure Period

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Post-closure care begins after completion of closure of the unit and continues for 30 years after that date (§§265.117(a)(1), 265.118(g)).	Post-closure monitoring and maintenance activities, as specified in the post-closure plan (see II.B.), must continue for a period of 30 years beyond the closure of the unit. The Regional Administrator may: o Shorten the post-closure care period. o Lengthen the post-closure care period. o Require continuation of any security requirements of §265.14 during part or all of the post-closure period. o Allow disturbance of the disposal unit's cover, liners, other components of the containment system or function of the monitoring systems in order to protect human health and environment. Otherwise, post-closure use of property must not disturb the disposal site cover, etc. Documentation justifying adjustment of the post-closure care period must be present in the record. That documentation must make the demonstrations required by §265.118(g)(1)(i).		

II. GENERAL POST-CLOSURE REQUIREMENTS
E. Amendment of Post-Closure Plan

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Amendment of the post-closure plan (§265.118(d)).	The plan must state that the owner/operator will amend the post-closure plan whenever: 1) changes in operating plans or facility design affect the post-closure plan; or, 2) events which occur during the active life of the facility, including partial and final closures, affect the post-closure plan. These amendments must be made at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post-closure plan. If the owner/operator of a waste pile or surface impoundment intended to remove all hazardous wastes at closure, but finds he must close as a landfill per §265.310, then he must submit a post-closure plan within 90 days of determination that the unit must be closed as a landfill.		

Effective
January 12, 1981

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Post-closure notices (§265.119(a) and (b)).	The plan must specify that no later than 60 days after certification of closure of each hazardous waste disposal unit, the owner/operator will submit to the local zoning authority, or authority with jurisdiction over local land use, and the Regional Administrator, a record of the type, quantity and location of hazardous wastes disposed in each cell or other disposal unit for those wastes disposed of before January 12, 1981. This information must be provided in accordance with any records the owner/operator has kept, and to the best of his knowledge. The plan must state that within 60 days of certification of closure of the first hazardous waste disposal unit and within 60 days of certification of closure of the last disposal unit, the owner/operator will: A) Record a notation in the deed that: 1) The land has been used to manage hazardous waste; 2) Its use is restricted under 40 CFR Subpart G; and 3) The survey plat and record of waste disposal required by §§265.116 and 265.119(a) have been filed with the local zoning authority or the authority with jurisdiction over local land use and with the Regional Administrator; and B) Submit, to the Regional Administrator, a signed certification specifying that the notation in the deed has been recorded per §265.119(b)(1), together with a copy of the document in which the notation has been placed.		

Effective
January 12, 1981

II. GENERAL POST-CLOSURE REQUIREMENTS
G. Certification of Post-Closure

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Certification that the post-closure care period for the disposal unit was performed in accordance with the specifications of the approved post-closure plan (§265.120).	The plan must state that the owner/operator will submit by registered mail, no later than 60 days after the completion of the established post-closure care period for each disposal unit, a certification that the post-closure care period for the unit was performed in accordance with the approved post-closure plan. The certification must be signed by the owner/operator and an independent certified registered professional engineer. Documentation supporting the engineer certification must be furnished upon request until owner/operator has been released from the financial assurance requirements under §265.145(h).		

Effective
October 29, 1986

II. GENERAL POST-CLOSURE REQUIREMENTS
H. Post-Closure Cost Estimate

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
An estimate of the annual cost of post-closure monitoring and maintenance (§265.144).	The cost estimate must provide an estimated annual cost for monitoring, inspection and maintenance activities as specified in the post-closure plan. The post-closure cost estimate must be based on the costs to the owner/operator of hiring a third party to conduct post-closure care activities. A third party is a party who is neither a parent nor a subsidiary of the owner/operator. The post-closure care costs should be based on quantities and unit prices for materials and labor (including supervision) as provided by a third party. The post-closure cost estimate is calculated by multiplying the annual post-closure cost estimate by the number of years of post-closure care. Cost incurred on a periodic basis should be included. During the active life of the facility (including the closure period), the post-closure cost estimate must be adjusted annually for inflation according to §265.144(b).		

Effective
April 7, 1982

II. GENERAL POST-CLOSURE REQUIREMENTS
H-2. Revisions to Post-Closure Cost Estimate

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
Revisions to the post-closure cost estimate (§265.144(c)).	The plan must state that the post-closure cost estimate will be revised no later than 30 days after the Regional Administrator has approved the request to modify the plan, if the change in the post-closure plan increases the cost of post-closure care.		

Effective
April 7, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A detailed description of the steps needed to remove or decontaminate all hazardous waste residues and contaminated containment system components, soils, and equipment (§265.112(b)(4). All contaminated equipment, structures, and soils must be properly disposed of or decontaminated (§265.114).	The closure plan must indicate whether the liner or base of the container storage area contains hazardous waste residues and, if so, describe how the liner or base will be decontaminated. This should include a description of the following: 1) Cleaning procedure (such as steam cleaning or scrubbing with cleaning solution); 2) Cleaning or decontaminating agent and a justification that the use of a particular agent is suitable for the types of wastes which were stored; and 3) How the cleaning agent will be properly treated and/or disposed as a hazardous waste, including the identification and description of the type(s) of hazardous waste management units to be used. The plan also must specify how the waste will be transported to the waste management unit(s). If the contaminated liner or base (e.g., soils) is to be removed and disposed, the plan must specify the procedures for determining the extent of contamination and removal of the contaminated materials. The plan must identify and describe the type(s) of hazardous waste management unit(s) to be used for disposal. The plan also must specify how the waste will be transported to the waste management unit(s). The plan must specify how equipment used during closure, such as brushes and shovels, will be properly decontaminated or disposed as hazardous wastes.		

Effective
January 12, 1981
and
October 29, 1986

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A description of the methods for sampling and testing surrounding soils and criteria for determining the extent of decontamination necessary to satisfy the closure performance standard (§§265.111, 265.112(b)(4)).	The plan must provide criteria to be used to judge the success of the decontamination efforts. This generally will be on the basis of detection of, or specific concentrations for, appropriate hazardous wastes or constituents. The plan then must specify a testing program to determine if the standard of decontamination has been met. The testing program must include a description of sampling procedures, test parameters, and analytical methods. The method of sampling will vary depending on the type of base in the container storage area. For a concrete-lined area, a wipe test or sampling of rinsate from the base may be specified. For a soil base, a sufficient number of samples should be taken at random locations. Testing parameters selected as criteria for decontamination must be indicative of the wastes stored at the unit. The parameters specified should include the hazardous wastes stored in the unit, or their hazardous constituents. Analytical methods must be specified for each parameter. Only methods from SW-846 or methods approved under §260.21 are acceptable. If an alternative method has been approved, the record should contain analytical data or other justification demonstrating that the approved method is equivalent to that specified in SW-846.		

Effective
January 12, 1981
and
October 29, 1986

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
At closure, all hazardous waste residues must be removed from tanks, discharge control equipment, and discharge confinement structures (§265.197). A detailed description must be given of the steps needed to remove or decontaminate hazardous waste residues, contaminated containment system components, soils and equipment (§265.112(b)(4)). All contaminated equipment, structures, and soils must be properly disposed or decontaminated (§265.114). Effective January 12, 1981 and October 29, 1986	The closure plan must describe how hazardous waste residues will be removed from the tank and appurtenant equipment (e.g., pipes, pumps). The closure plan also must determine whether the tank containment area contains hazardous waste residues and, if so, should describe how the containment area will be decontaminated. These decontamination procedures for the tank, associated equipment, and containment area should include: 1) Cleaning procedure (such as steam cleaning or scrubbing with cleaning solution); 2) Cleaning or decontaminating agent and a justification that the use of a particular agent is suitable for the types of wastes which were held in the tanks; and 3) How the cleaning agent will be properly treated and/or disposed as a hazardous waste, including the identification and description of the type(s) of hazardous waste management unit(s) to be used. The plan also must specify how the waste will be transported to the waste management unit(s). If the contaminated tank, associated equipment, and contaminated containment area are to be removed and disposed, the plan must specify the procedures for removal and the disposition of these items upon removal. If the containment area is of soil, the plan should specify the procedures for determining the extent of contamination and removal of the contaminated materials. The plan must identify and describe the type(s) of hazardous waste management unit(s) to be used for disposal of the contaminated tank, equipments, and soils. The plan must specify how these materials will be transported to the waste management unit(s). The plan must specify how equipment used during closure, such as brushes and shovels, will be properly decontaminated or disposed as hazardous wastes.		

B-3. Sampling and Testing to Demonstrate Success of Decontamination

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A description of the methods for sampling and testing for determining the extent of decontamination and/or the success of decontamination efforts (§265.112(b)(4)).	The plan must provide criteria to be used to judge the success of the decontamination efforts. This generally will be on the basis of detection of, or specific concentrations for, appropriate hazardous wastes or constituents. The plan then must specify a testing program to determine if the standard of decontamination has been met. The testing program must include a description of sampling procedures, test parameters, and analytical methods. The method of sampling tanks may vary from a wipe test to rinsing with water or solvent. A sufficient number of samples must be taken to adequately sample the tank, appurtenances, and confinement area (including soils). For a soil confinement area, a sufficient number of samples should be taken at random locations. Testing parameters selected as criteria for decontamination must be indicative of the wastes stored in the tank. The specified parameters should include the hazardous waste(s) stored in the tank, or its hazardous constituents. Analytical methods must be identified for each parameter. Only methods from SW-846 or methods approved under §260.21 are acceptable. If an alternative method has been approved, the record should contain analytical data or other justification showing that the approved method is equivalent to that specified in SW-846.		

Effective
January 12, 1981
and
October 29, 1986

V. CLOSURE OF SURFACE IMPOUNDMENTS
A. Closure By Waste Removal
A-1e. Removal of Waste Inventory
A-1f. Removal of Waste Residues

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A detailed description of the steps needed to remove or decontaminate all hazardous waste residues and contaminated containment system components, equipment, structures, groundwater, and soils during partial and final closure (§265.112(b)(4)). A description of the methods for removing, transporting, treating, or disposing of all hazardous wastes (including waste residues and materials contaminated with hazardous waste) and identification of and the type(s) of off-site hazardous waste management unit(s) to be used (§265.112(b)(3)).	The closure plan must provide a detailed plan for removal of the following: o Standing liquids; o Waste residues; o Liner containment system components (if applicable); o Leachate and leachate collection system components, and o Contaminated subsoils. The plan should address the following: o Description of any processing of the waste residues (e.g., stabilization prior to removal); o Method of residue and contaminated material removal; o Method of transporting wastes; and o Identification and types of off-site hazardous waste management units. Note: The facility cannot be clean closed (i.e., no post-closure requirements) as long as contaminated soils or groundwater remain.		

Effective
January 12, 1981
and
October 29, 1986

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A description of the methods for sampling and testing surrounding soils and criteria for determining the extent of decontamination (§§265.112(b)(4), 265.228(b)).	The plan also must provide a testing program to determine when the site is clean. The testing program must include: o Sampling procedures, including locations and frequency; o Parameters to be tested for, including a justification of the parameters selected; o Test or analytical procedures to be used (only methods from SW-846 or methods approved under §260.21 are acceptable); and o A detailed discussion of the criteria to be used to evaluate test results in order to determine whether the site is clean. If the waste tested for is a characteristic waste, the site should be cleaned until the sampled materials no longer exhibit the characteristic. If the waste is tested for a listed waste or constituent, the plan should specify the contaminant level at which soils will be considered "clean." In most cases, the level specified will be the background concentration in surrounding, uncontaminated soils. In some instances, "...below the level of detection" will be specified. Note: Under §265.112(c)(3), owners/operators of surface impoundments and waste piles who intended to remove all hazardous waste at closure, but were unable to do so (and thus, are required to close the unit as a landfill in accordance with §265.310) must amend the closure plan no later than 30 days after the determination that closure as a landfill is required.		

Effective
January 12, 1981
and
October 29, 1986

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
If all wastes and contaminated materials are not removed, the impoundment must be closed as a landfill in accordance with the requirements of §265.310. Post-closure care must be provided as for a landfill (§265.228(c)).	The closure plan must provide a detailed plan for removal or treatment of any wastes or contaminated materials to provide an adequate foundation for the cover. (Final cover is discussed in Section VIII, C.) In addition to all items identified in Section VIII of the protocol, the plan must address the following issues, as applicable: o For materials that are removed, address the items contained in Section V, A-1e and A-1f; o Method of stabilization or solidification of liquid and sludges left in-place; o Procedures and equipment to be used; o Procedures for equipment decontamination as per Section VI, A-1; o Procedures for protection of surface water and groundwater sources during the work; o Method of controlling wind dispersal of the materials; and o Special handling procedures (such as for ignitable or reactive wastes). The plan also must indicate any material testing procedures which will be required to assure adequate support for the cover is supplied by the waste material. The testing program must include: o Sampling procedures, including frequency; o Parameters to be tested for, including a justification of the parameters selected; o Test or analytical procedures to be used, including copies of any methods which are not standard test methods; and o A detailed discussion of the criteria to be used to evaluate the test results.		

Effective
May 19, 1980

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
	Finally, the closure plan must include calculations and data that demonstrate that the final cover will have sufficient support provided by the waste material (with or without stabilization or solidification as applicable). Documentation such as checklists or supporting calculations must be included in the record that the engineering calculations have been technically reviewed and were approved.		

VI. CLOSURE OF WASTE PILES

A. Closure by Waste Removal

A-1f. Detailed Description of Removal of Waste Residues

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
At closure, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless §261.3(d) applies (§§265.112(b)(4), 265.58(a)).	The closure plan must provide a detailed plan for removal [option of decontamination is discussed on page 4-24] of the following: o Waste and waste residues; o Containment system components (if applicable); o Equipment and structures; and o Contaminated subsoils. The plan should address the following: o Description of any processing of the waste residues (e.g., stabilization prior to removal); o Method of residue and contaminated material removal; o Method of transporting wastes; and o Identification and types of off-site hazardous waste management units.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
All contaminated equipment, structures, and soils must be properly disposed or decontaminated (§265.114).	For equipment or structures that are to be decontaminated, the following must be provided: o Method of decontamination; o Procedures to protect the environment during decontamination (for example, how would wash water be collected); o Method of removing wash waters and transporting them to off-site waste management unit(s); o Identification and types of the off-site waste management unit(s); and o Testing procedures, sampling methods and frequencies, and criteria and parameters to be used to judge when decontamination is complete.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A description of the methods for sampling and testing surrounding soils and criteria for determining the extent of decontamination (§§265.112(b)(4), 265.258(b)).	The plan also must provide a testing program to determine when the site is clean. The testing program must include: o Sampling procedures, including locations and frequency; o Parameters to be tested for, including a justification of the parameters selected; o Test or analytical procedures to be used (only methods from SW-846 or methods approved under §260.21 are acceptable); and o A detailed discussion of the criteria to be used to evaluate test results in order to determine whether the site is clean. If the waste tested for is a characteristic waste, the site should be cleaned until the sampled materials no longer exhibit the characteristic. If the waste is tested for a listed waste or constituent, the site should be cleaned until analytical procedures can no longer detect the waste or constituent in the sample or the sample shows background levels of waste or constituent. If groundwater contamination is suspected based on extensive soil contamination, the owner/operator should propose a groundwater monitoring program, if one does not already exist. Note: If, after removing or decontaminating all residues and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills (§265.310). See Section VIII of the evaluation protocol.		

Effective
October 29, 1986

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
If, after removing or decontaminating all residues and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment as required in paragraph (a) of this section, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills (§265.258(b)).	The closure plan must provide a detailed plan for removal or treatment of any wastes or contaminated materials to provide an adequate foundation for the cover. (Final cover is discussed in Section VIII, C.) In addition to all items identified in Section VIII of the protocol, the plan must address the following issues, as applicable: o For materials that are removed, address the items contained in Section VI, A-1e and A-1f; o Method of stabilization or solidification of liquid and sludges left in-place; o Procedures and equipment to be used; o Procedures for equipment decontamination; o Procedures for protection of surface water and groundwater sources during the work; o Method of controlling wind dispersal of the materials; and o Special handling procedures (such as for ignitable or reactive wastes). The plan also must indicate any material testing procedures which will be required to assure adequate support for the cover is supplied by the waste material. The testing program must include: o Sampling procedures, including frequency; o Parameters to be tested for, including a justification of the parameters selected; o Test or analytical procedures to be used, including copies of any methods which are not standard test methods; and o A detailed discussion of the criteria to be used to evaluate the test results.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
	Finally, the closure plan must include calculations and data that demonstrate that the final cover will have sufficient support provided by the remaining subsoils. Documentation such as checklists or supporting calculations must be included in the record that the engineering calculations have been technically reviewed and were approved.		

VII. CLOSURE OF LAND TREATMENT UNITS
C. Objectives of the Closure Plan
C-1. Control of Migration of Hazardous Constituents to Groundwater

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In the closure plan required under §265.112, the owner or operator must indicate how migration of hazardous waste and hazardous waste constituents from the treated area into the groundwater will be controlled (§265.280(a)(1)).	The plan must specify the procedures/structures to be employed to prevent the migration of hazardous waste and hazardous waste constituents to the groundwater. There generally are two avenues of reasoning that can be employed in demonstrating that groundwater will be protected. o The closure plan may indicate that all contaminated soils will be excavated and removed. By removing the source of con-contamination, the possibility for groundwater contamination is eliminated. In this instance, the requirements under item E-1 must be addressed; or, o The closure plan may indicate that all hazardous constituents have been effectively treated (i.e., transformed, immobilized or degraded) in the treatment zone. In this situation, the closure plan must provide all data used in making this determination. Those data should consist of the results of soil core and unsaturated zone monitoring for the appropriate hazardous wastes, constituents and degradation products. Also, the plan must demonstrate how the procedures to be used at closure (e.g., placement of a cover), will prevent migration of hazardous constituents into the groundwater. Such a demonstration may focus on the permeability of the cover, the immobilization of hazardous constituents on soil particles, or upon other mechanisms. For treatment units with a final cover, see Section VIII, C of the protocol for guidance on cover design and construction.		

Effective
July 26, 1982

VII. CLOSURE OF LAND TREATMENT UNITS
C. Objectives of the Closure Plan
C-2. Control of Release of Contaminated Runoff to Surface Waters

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In the closure plan required under §265.112, the owner or operator must indicate how release of hazardous constituents to surface waters via contaminated runoff will be controlled (§265.280(a)(2)).	The plan must specify how the closure activities will prevent a release of contaminated runoff to surface waters. To make this demonstration, the closure plan must show one of two situations. o The closure plan must show that hazardous constituents will be prevented from contacting runoff through the use of a cover. In this situation, the plan must specify the cover characteristics (see item C-2); or, o The closure plan must show that the release of runoff containing hazardous constituents will be prevented through proper runoff control features. In this case, the plan must demonstrate that the closed unit will be capable of preventing runoff from a 24-hour, 25-year storm event.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In the closure plan required under §265.112, the owner or operator must specify how wind dispersal of particulate matter from the treatment zone will be controlled (§265.280(a)(3)).	Wind dispersal of particulates is largely controlled by soil moisture content and activities on the treatment zone during arid periods. As such, the following must be specified: o the range of soil moisture to be maintained and the methods for preventing soil desiccation; and, o that activities associated with particulate production (e.g. tilling) will not be conducted during arid periods, or when the soil moisture content is conducive to dust generation; or, o that a cap or a vegetative cover preventing wind dispersal will be established (see item E-2).		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In the closure plan required under §265.112, the owner or operator must specify how compliance with §265.276, concerning the growth of food-chain crops, will be attained (§265.280(a)(4)).	Food-chain crops must not be grown on the treated area of a hazardous waste land treatment facility unless the owner or operator can demonstrate, based on field testing, that any arsenic, lead, mercury or other constituents identified under §265.273(b): o will not be transferred to the food crop portion of the crop by plant uptake or direct contact, and will not otherwise be ingested by food-chain animals; or, o will not occur in greater concentrations in the crops grown on the land treatment facility than in the same crops grown on untreated soils in the same region. The demonstration must consist of: o tests for the specific wastes and application rates; o descriptions of crop and soil characteristics; and o descriptions of sample size, sample collection procedures, analytical methods, and statistical procedures. Food-chain crops must not be grown on a land treatment unit that received cadmium unless all requirements under §265.276(c)(1)(i) through (iii) or §265.276(c)(2)(i) through (iv) are met.		

Effective
July 26, 1982

VII. CLOSURE OF LAND TREATMENT UNITS

E. Methods to be Considered in Addressing the Closure and Post-Closure Care Objectives

E-1. Removal of Contaminated Soil

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In closing a land treatment unit, the owner or operator must consider the removal of contaminated soils (§265.280(c)(1)).	Removal of contaminated soil is one possible approach to the closure of a land treatment unit. It is not however, applicable in all cases. In some situations the owner or operator may choose to leave the treatment zone in place if all hazardous constituents have been effectively treated. If the treatment zone is to be removed at closure the following information must be provided. o The method for removal of contaminated soil, including equipment to be used. o The final disposition of the contaminated soil. o The criteria for determining when all contaminated soil has been removed. o The testing procedures to be employed during closure to ensure removal of the contaminated soil. The test procedures specified must include a description of the sampling program to be employed, the analytical program and the test parameters to be monitored.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
During the closure period the owner or operator must continue unsaturated zone monitoring. The soil pore liquid monitoring may be terminated 90 days after the last application of waste to the treatment zone (§265.280(d)(1)).	The information submitted concerning unsaturated zone monitoring must specify the following: o The location (or method or selection of location) of all sampling points within the treatment area. o The location of background sampling points and documentation that the background area soils monitored are representative of the soil types in the treatment area. o The methods for sample collection including the type and installation (as applicable) of sampling devices. o The methods for sample preservation and shipment including chain-of-custody procedures. o The parameters to be monitored, along with documentation that those parameters are representative of the wastes treated, their hazardous constituents, or their degradation products. o The analytical procedures to be used. o The statistical procedures to be employed to evaluate the data. Generally, the unsaturated zone monitoring program must be patterned after the program used during active land treatment. Additional guidance is provided on p. 573 of SW-874, and in EPA/530-SW-84-016.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In closing a land treatment unit, the owner or operator must consider the placement of a final cover on the unit (§265.280(c)(2)).	Except where no significant concentrations of hazardous constituents remain in the treatment zone, the final surface should be covered with a permanent cover to prevent water and wind borne erosion and off-site transport of soil and/or hazardous materials. The plan must provide the following: o Drawings showing cover layers and thicknesses, final surface contours, slope, length of run of slope, and overall dimensions. o Common name, species, and variety of cover crop to be established, if a cover crop is to be planted. o Data demonstrating that the cover crop can thrive in the soils and climate in which it will be planted. o Descriptions, including drawings and calculations if applicable, of infiltration control, erosion and runoff control, and wind erosion control. In some arid climates a rock cover (rather than vegetation) is sometimes used. In these cases, hydraulic calculations should be provided to demonstrate that the cover will not be eroded by rainfall and overland flow. Note: If hazardous constituents remain in the treatment zone, the unit must be closed as a landfill in accordance with §265.310.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
During the closure period, the owner or operator must maintain the runoff management system required under §§265.272(c), 265.280(d)(3)).	The runoff control and management system must be maintained and managed during the closure period. The plan must specify that the runoff management system is capable of collecting and controlling the water volume equivalent to a 24-hour, 25-year storm event. The plan for management of the runoff control system must specify the following: o how collection and holding facilities associated with the runoff control system will be managed after storms to maintain their capacity; o the testing and analytical protocol for determining the levels of hazardous constituents in the runoff; o the ultimate disposition of collected runoff. Additional guidance is provided on p. 572 of SW-874.		

Effective
July 26, 1982

VII. CLOSURE OF LAND TREATMENT UNITS

H. Requirements for Land Treatment Units During the Post-Closure Care Period

H-1. Continuation of Soil Core Monitoring

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
In addition to the requirements of §265.17 during the post-closure care period, the owner or operator must continue soil-core monitoring by collecting and analyzing samples in a manner and frequency specified in the post-closure plan (§265.280(f)(1)).	The plan for soil-core monitoring in the unsaturated zone must include the following: o The method for selection of the location of sampling points. o The frequency with which all monitoring will be conducted. o The sampling method to be employed. o Methods for sample preservation and transport, including chain-of-custody procedures. o Discussion relating the indicator parameters to the hazardous wastes treated in the unit (e.g., constituents, degradation products). o Analytical procedures for sample analysis. o Statistical procedures for data analysis. o A description of the background sampling area, and documentation that its soils are representative of the treatment area soils.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
As required by §265.280(f)(2), during the post-closure care period, the owner or operator must restrict access to the unit as appropriate for its post-closure use.	The requirement for restriction of access during the post-closure care period must include a consideration of the following: o The wastes treated during the active life of the unit. o The concentrations of waste or waste constituents present after closure. o The potential for migration of hazardous constituents out of the treatment zone, and; o The potential for human or livestock exposure to hazardous constituents. The plan must explicitly describe access control features and discuss how they achieve the required goals.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
During the post-closure period, the owner or operator must continue to comply with §265.276 concerning the growth of food-chain crops (§265.280(f)(3)).	Food-chain crops must not be grown on the treated area of a hazardous waste land treatment facility unless the owner or operator can demonstrate, based on field testing, that any arsenic, lead, mercury or other constituents identified under §265.273(b): o will not be transferred to the food crop portion of the crop by plant uptake or direct contact, and will not otherwise be ingested by food-chain animals; or, o will not occur in greater concentrations in the crops grown on the land treatment facility than in the same crops grown on untreated soils in the same region. Food-chain crops must not be grown on a land treatment unit that received cadmium unless all requirements under §265.276(c)(1)(i) through (iii) or §265.276(c)(2)(i) through (iv) are met. Prohibition of food-chain crops must be noted on the deed to the property. The demonstration must consist of: o results of tests using the specific wastes and application rates; o description of crop and soil characteristics; and o descriptions of sample collection procedures, sample sizes, analytical methods, and statistical procedures.		

Effective
July 26, 1982

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
The post-closure plan must specify the planned inspection and maintenance activities for the unit during the post-closure care period (§265.118(c)).	The closure/post-closure plan must include a detailed inspection and maintenance plan. The plan must address the following items as applicable: o final cover integrity (cap and/or vegetative cover); o settlement of final cover; o run-on and/or runoff control systems; o cover erosion; o access control features; o groundwater monitoring system; and o unsaturated zone monitoring system. The inspection plan must address the following: o frequency of inspections, including justification of selected frequency; o items to be inspected; o problems or conditions to look for; o procedures to undertake if a problem exists; and o inspection documentation procedures (maintenance of records and reporting). The maintenance plan must provide the procedures which will be followed to correct problems within the post-closure period. Items which should be included as applicable are: o groundwater well replacement (including above-ground portions);		

Effective
January 12, 1981

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
	o lysimeter replacement; o repair of cover erosion including re-establishment of vegetation; o cover settlement; o redefinition of drainage control structures; o control of vegetation growth; o repair of access control features; and o removal of burrowing animals.		

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
As required by §265.310 at final closure of the landfill or upon closure of any cell, the owner or operator must cover the landfill or cell with a final cover designed and constructed to: 1) Provide long-term minimization of migration of liquids through the closed landfill; 2) Function with minimum maintenance; 3) Promote drainage and minimize erosion or abrasion of the cover; 4) Accommodate settling and subsidence so that the cover's integrity is maintained; and 5) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present. Effective April 23, 1985	The EPA recommended cover should consist of the following (from bottom to top): o A two-foot-thick soil layer having a permeability of 1×10^{-7} cm/sec or less, o A 20 mil or thicker synthetic liner, o A 12-inch-thick drainage layer, o A two-foot thick soil layer, and o A vegetation crop. The slope of the final cover surface should be at least 3%. The detailed description and drawings of the cover should include such items as applicable: o Drawings showing overall plan view of cover with dimensions and cross-sections showing slopes, layers, and thicknesses; o The name, species, and variety of the cover crop; o Strength, thickness, brand name, and manufacturer of synthetic liner; o Description of drainage layer; o Characteristics, thickness, permeability of low permeable soil layer; o Potential settlement of the cover; o Potential for gas generation; o Effects of freeze-thaw cycles on the cover; o Material specifications for all the components of the cover system; and o Construction specifications for placing the cover. A detailed construction inspection program must be included which describes: o Qualifications necessary for the inspectors;	Draft Guidance Document (1982): Landfill Design - Liner Systems and Final Cover SW-867: Evaluating Cover Systems for Solid and Hazardous Wastes. 1982.	

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS

- Test procedures to be used indicating acceptance criteria, sampling procedures and frequency, and testing methods;
- Recordkeeping procedures; and
- Basic duties of the inspectors.

Also included must be detailed engineering calculations addressing:

- Erosion of the cover soils,
- Free drainage of precipitation off of the cover,
- Free drainage of the drainage layer, and
- Potential of clogging of the drainage area.

Applicants are not required to use the recommended cover; therefore some plans will specify covers that are different than the one described above.

In cases where a cover design other than the recommended cover is used, the record also must contain detailed engineering calculations which address:

- Long-term minimization of liquids through the closed landfill
- A demonstration that the permeability of the cover equals or is less than that of the bottom liner system or natural subsoils present.

Documentation such as checklists or supporting engineering calculations must be included in the record.

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
As required by §265.310(b), after final closure, the owner or operator must comply with all post-closure requirements contained in §§265.117-265.120 including maintenance and monitoring throughout the post-closure care period. The owner or operator must: 1) Maintain the integrity and effectiveness of the final cover, including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events; 2) Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of Subpart F of this part; 3) Prevent run-on and runoff from eroding or otherwise damaging the final cover; and 4) Protect and maintain surveyed benchmarks used in complying with §265.309. Effective April 23, 1985	The post-closure plan must include a detailed inspection and maintenance plan to ensure integrity of the final cover and the proper operation of monitoring equipment. The plan must address the following items as applicable: o final cover integrity; o settlement of final cover; o run-on and/or runoff control systems; o cover erosion; o leachate collection/removal detection systems; o gas collection and control system; o groundwater monitoring system; and o surveyed benchmarks. The inspection plan must address the following: o frequency of inspections, including justification of selected frequency; o items to be inspected; o problems or conditions to look for; o procedures to undertake if a problem exists; and o inspection documentation procedures, such as records, inspection logs, etc. The maintenance plan must provide the procedures which will be followed and an estimate of the materials needed to correct the most likely to occur problems within the post-closure period. Items which should be included as applicable are: o groundwater well replacement; o cover erosion; o cover settlement;		

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS

- control of vegetation growth;
- control of wild animals (such as groundhogs which dig holes in the cover); and
- replacement of benchmarks.

Finally, the plan must describe in detail how any leachate collection/detection system will be operated during the post-closure period. Included must be:

- frequency of inspection for leachate, including justification for the selected frequency;
- method of leachate removal and transportation;
- disposition of collected leachate;
- any testing procedures used to test the leachate, including analytical methods and test parameters;
- documentation procedures to document quality, quantity, and dates leachate was observed and/or removed.

VIII. CLOSURE OF LANDFILLS

E. Groundwater Monitoring

E-1. Monitoring System

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
As per 40 CFR 265.91, the permit must specify, in detail, the individual elements of the detection monitoring system, including the number, location, sampling depths, and design features of all background and compliance point wells.	The monitoring well system must first and foremost be consistent with supporting information defining the "uppermost aquifer" and associated groundwater flow rates and directions. The definition of "aquifer" as presented in 40 CFR 260.10 is "... a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs." Significant yield is determined on a case-by-case basis. In those formations that do not yield significant amounts of water, enforcement authorities may be invoked to have them monitored. Heterogeneity of the subsurface necessitates that care be taken in the selection of well locations and depths. In general, this will dictate the placement of compliance point wells very close to the down-gradient boundary of the regulated unit and in the uppermost permeable, saturated horizon. The information provided by the owner/operator to support the uppermost aquifer identification and related well locations must be sufficient to identify and define all logical pathways from the facility. The site-specific data offered must consist of subsurface boring logs and hydrogeologic cross-sections, the number of which should be commensurate with the subsurface complexity of the site. Also required are groundwater level data and groundwater contour mapping based on on-site well measurements sufficient to define seasonal variations in groundwater gradient, flow direction, and rate. Boring logs and well construction details must be included for existing wells used to determine hydraulic gradients and groundwater flow direction. The number of wells required for a given facility is site specific. The number must be sufficient to provide reasonable certainty that if leakage were to occur, it would be readily detected. Thus, the required number of wells is proportional to the number of potential migration routes. In some cases, multiple depth monitoring may be required where the	TEGD	

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REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
	must be given to the nature of the leakage (if it occurs). At unlined facilities, leakage is likely to be diffuse and affect a large portion of the facility, while facilities with synthetic liners may undergo "pinpoint" leaks of high rate but small area. Thus, a lined facility may actually require more detailed monitoring to detect small plumes than a comparable unlined facility.		
	Well design and construction features must be consistent with agency guidance. Inert well construction materials, proper sealing techniques, and adequate security features must be incorporated. The record must include a description of the well drilling methods used or proposed. The addition of foreign materials such as drilling muds or fluids into the drilled hole must be avoided. For existing wells, the permit must contain as-built construction drawings or specifications with actual dimensions of depth and screened interval. For proposed wells, a typical design must be included showing anticipated dimensions.	Technical Enforcement Guidance Document	

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
As per 40 CFR 265.92(a), the permit must specify the procedures and techniques to be used for groundwater sample collection.	The sampling procedures specified in the closure plan must be consistent and designed to ensure monitoring results that provide a reliable indication of groundwater quality. Procedures for evacuating stagnant water from the well prior to sampling, as well as procedures for withdrawal of the actual sample must be specified. Also, sample collection procedures should specify the method of water level measurement in each well. Of particular importance with regard to sample collection are: o Use of inert materials in sampling equipment to ensure that samples are not contaminated or altered by foreign materials. o Use of sampling methodology which does not result in excessive exposure to the atmosphere or other gases causing chemical alteration. o Specification of adequate procedures to prevent cross-contamination; the procedures specified must be chosen to fit the nature of the sample analysis to be performed. The administrative record must contain documentation that sample collection procedures were reviewed for technical adequacy and were found to be suitable for the type of well construction and the nature of monitoring parameters to be analyzed. This review must include comparison of the proposed procedures to agency guidance.		

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E. GROUNDWATER MONITORING PROGRAM
E-3b. Statistical Comparisons

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
The permit must specify procedures to determine whether there has been a statistically significant change over background, indicative of facility leakage, for each parameter monitored at the compliance point (§265.93(b)).	The administrative record must demonstrate that the statistical procedures specified in the closure plan are suitable for comparing indicator parameter values to background levels. The basic statistical technique -- the Students' t-test -- is specified in detail in the regulations. The permit writer has the option of specifying the basic statistical technique or some other valid technique which may be suitable under the circumstances. Several alternative procedures are available as outlined in the agency guidance such as the Mann-Whitney U Test. Such alternative procedures are applicable only when water quality data exhibits specific characteristics. In specifying the basic Students' t-test or an alternative procedure, the permit writer must ensure that the observed characteristics of the monitoring data are such that the procedure is appropriate. For example, the basic Students' t-test is appropriate only when the background levels of a particular parameter are normally distributed (background sample coefficient of variation less than 1.00). The administrative record must contain sufficient background data from previous monitoring to allow such a determination. Alternatively, the closure plan may specify a statistical procedure based on probable characteristics for background data with the understanding that a modification may be necessary if subsequently obtained background data indicates this procedure is not suitable. The administrative record must document that suitable statistical procedures have been specified which achieve a reasonable balance between the probability of falsely identifying a non-contaminating facility and the probability of failing to identify a contaminating facility. The record also must document that the specified procedure(s) are suitable in light of background characteristics.		

Effective
May 19, 1980

IX. CLOSURE OF INCINERATORS
A-6. Removal of Waste Residues
B-1. Procedures for Cleaning Equipment

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
At closure, the owner/operator must remove all hazardous waste and hazardous waste residues (including but not limited to ash, scrubber waters, and scrubber sludges) from the incinerator (§265.351). All contaminated equipment, structures, and soils must be properly disposed or decontaminated (§265.114).	The closure plan must address the removal of all waste and residues, including: o ash o scrubber waters o scrubber sludges The procedures for decontaminating all equipment - including the incinerator, ash collection equipment, and emissions control equipment - must be provided. Alternatively, all or some of the equipment may be disassembled and disposed at a permitted landfill. For equipment or structures that will be <u>disposed</u>, the following must be provided: o list of equipment, o method of transporting wastes, o identification and types of off-site hazardous waste management unit(s), and o criteria to be used during closure to determine if any equipment originally listed for decontamination will be disposed of instead. For equipment or structures that are to be <u>decontaminated</u>, the following must be provided: o method of decontamination; o procedures to protect the environment during, decontamination (for example, how would wash water be collected; o method of removing wash waters and transporting them to off-site waste management unit(s); and o identification and description of the off-site waste management unit(s).		

Effective
January 23, 1981

B-3. Sampling and Testing to Demonstrate Success of Decontamination

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A description of the methods for sampling and testing for determining the extent of decontamination and/or the success of decontamination efforts (§265.112(b)(4)).	The plan must provide criteria to be used to judge the success of the decontamination efforts. This generally will be on the basis of detection of, or specific concentrations for, appropriate hazardous wastes or constituents. Specific, quantitative criteria should be specified in the plan. The plan then must specify a testing program to determine if the standard of decontamination has been met. The testing program must include a description of sampling procedures, test parameters, and analytical methods. The method of sampling may vary from a wipe test to rinsing with water or solvent. A sufficient number of samples must be taken to adequately sample the incinerator, appurtenances, and confinement area (including soils). For a soil confinement area, a sufficient number of samples should be taken at random locations. Testing parameters selected as criteria for decontamination must be indicative of the wastes burned in the incinerator. The specified parameters should include the hazardous waste(s) stored in the tank, or its hazardous constituents. Analytical methods must be identified for each parameter. Only methods from SW-846 or methods approved under §260.21 are acceptable. If an alternative method has been approved, the record should contain analytical data or other justification showing that the approved method is equivalent to that specified in SW-846.		

Effective
October 29, 1986

X. CLOSURE OF THERMAL TREATMENT UNITS
A-6. Removal of Waste Residues
B-1. Procedures for Cleaning Equipment

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
At closure, the owner/operator must remove all hazardous waste and hazardous waste residues (including, but not limited to, ash) from the thermal treatment process or equipment (§265.381).	The closure plan must address the removal of all waste and residues, including ash.		
All contaminated equipment, structures, and soils must be properly disposed or decontaminated (§265.114).	The procedures for decontaminating all equipment - including the thermal treatment unit, ash collection equipment, and emissions control equipment (if applicable) - must be provided. Alternatively, all or some of the equipment may be disassembled and disposed at a permitted landfill.		
	For equipment or structures that will be <u>disposed</u>, the following must be provided: o list of equipment, o method of transporting wastes, o identification and types of off-site hazardous waste management unit(s), and o criteria to be used during closure to determine if any equipment originally listed for decontamination will be disposed of instead.		
	For equipment or structures that are to be <u>decontaminated</u>, the following must be provided: o method of decontamination; o procedures to protect the environment during decontamination (for example, how would wash water be collected. o method of removing wash waters and transporting them to off-site waste management unit(s); and o identification and description of the off-site waste management unit(s).		

Effective
January 4, 1985

REGULATORY REQUIREMENT	EVALUATION CRITERIA	REFERENCES	FINDINGS/COMMENTS
A description of the methods for sampling and testing for determining the extent of decontamination and/or the success of decontamination efforts (§265.112(b)(4)).	The plan must provide criteria to be used to judge the success of the decontamination efforts. This generally will be on the basis of detection of, or specific concentrations for, appropriate hazardous wastes or constituents. Specific, quantitative criteria must be stated in the plan. The plan then must specify a testing program to determine if the standard of decontamination has been met. The testing program must include a description of sampling procedures, test parameters, and analytical methods. The method of sampling may vary from a wipe test to rinsing with water or solvent. A sufficient number of samples must be taken to adequately sample the treatment unit, appurtenances, and confinement area (including soils). For a soil confinement area, a sufficient number of samples should be taken at random locations. Testing parameters selected as criteria for decontamination must be indicative of the wastes treated in the unit. The specified parameters should include the hazardous waste(s) stored in the tank, or its hazardous constituents. Analytical methods must be identified for each parameter. Only methods from SW-846 or methods approved under §260.21 are acceptable. If an alternative method has been approved, the record should contain analytical data or other justification showing that the approved method is equivalent to that specified in SW-846.		